ATW-17
A Good Fit

Tucson, Arizona
March 28, 1973

Mr. Richard H. Nolte
Institute of Current World Affairs
535 Fifth Avenue
New York, New York 10017

Dear Mr. Nolte:

Have you ever laughed so hard that tears streamed down your face and you found yourself collapsed on the floor almost unable to breathe? How did you feel immediately afterward? Cleaned out? Invigorated? Healthy? High? Although there is considerable social pressure against losing control of oneself in such a flamboyant way, most persons who experience true fits of laughter feel very good indeed when they recover their composure. We have all heard that "laughter is the best medicine." In this newsletter, I would like to offer a neurological explanation of why that may be literally true.

I am interested here not in guffaws or chuckles, which are simply learned vocalizations, but in uncontrollable spasms of laughter -- the kind that lead after several minutes to loss of upright posture, paralysis of the diaphragm (accounting for the inability to speak or breathe and the pain in the abdomen), and copious production of tears.

When I was growing up in Philadelphia, my father's mother Mayme lived with us for a time. She was subject to fits of what we called the "giggles" (a great understatement), and it was my impish pleasure to help trigger them whenever I could. My grandmother seldom drank alcohol, but at family dinner parties she loved to have an after-dinner Alexander; apparently, the gin

in this drink was the priming agent. At least, at a certain point after imbibing her Alexander, Mayme was highly susceptible to spectacular laughing fits that could be brought on by the telling of jokes, by the laughing of others, or (my specialty) by surreptitious tickling.When my grandmother was "giggling," as we politely called it, any dinner party would grind to a halt, and the guests would sit in awkward silence while Mayme laughed herself out, usually in ten minutes. When she was finished, her face would be flushed and wet with tears, she would breathe in short gasps and would gradually return to normal consciousness. The family dinner would resume, and my grandmother's performance would never be mentioned. I, for one, got a terrific contact high from it.

I have always suspected that Mayme was onto a good thing, and I am happy to have inherited in some degree the ability to abandon myself to hysterical laughter. It feels that good. Only recently, however, have I bothered to wonder about why it is good to laugh till you cry.

Not much information is available on the physiology of laughter. But something is known about tear production (lacrimation), and that might be a convenient starting point.

All on their own, continuously, and independently of their nerve supplies, the lacrimal grands produce a certain amount of tears to keep the surface of the eye moist; this is called "basic secretion." A second kind of lacrimation is in response to certain drugs called secretogogues that stimulate the gland directly when dropped into the eye. A third kind is reflex tearing in response to strong stimulation of the optic nerve (bright light) or olfactory nerve (red pepper) or in response to irritation of the eyeball itself, as by smoke. In all of these cases the offending stimulus is carried to the brain by sensory nerves, eventually to reach and trigger a group of cells called the lacrimal nucleus. The nerve fibers originating in this nucleus

carry the outgoing impulse to the tear glands, making them secrete. These outgoing nerves are part of the parasympathetic division of the autonomic or "involuntary" nervous system.

Now the lacrimal nucleus is in a part of the brainstem called the pons. The brainstem is a group of midline structures connecting the cerebral hemispheres to the spinal cord, and the pons is midway along it, lying between the lowest brainstem structure (the medulla) and the midbrain, higher up. Many of the involuntary functions of our bodies have their controlling centers in the brainstem, and many of the most important parasympathetic nerves originate here. The brainstem is thus a locus of much of our unconscious mental activity, just as the cerebral hemispheres are the seat of our conscious mental life. The brainstem is a physical connection between the hemispheres and the spinal cord; it may also be thought of as a connection between mind and body.

I have mentioned three types of tearing. There is a fourth, known as psychogenic tearing, and it seems to be unique to humans. Psychogenic tearing is tearing that accompanies emotional states: crying (in joy or pain or sorrow) and laughing. It is "mind-caused" lacrimation and is mediated in the same way as reflex tearing (that is, from the lacrimal nucleus to the glands via parasympathetic fibers), but the causative stimulus originates in the mind -- presumably in the cortex of the cerebral hemispheres -- rather than in the periphery of the body. Animals do not show psychogenic tearing. (The humor of laughing hyenas is quite dry.) Nor do newborn infants have it; most babies do not cry emotional tears until they are a month old.

The discovery of anything unique to humans is important as a clue to what we are, especially if it is a phenomenon that sheds light on the relationships between our minds and bodies. I have written often that a key to health of mind and body is integration of conscious and unconscious activity. The more open

and functioning are the channels between the day mind and the night mind, the more we can consciously receive and benefit from the influences that come to us through the unconscious. At the same time, we can exert beneficial effects on our bodies by means of these same channels -- as in the control of violent emotional states by the conscious regulation of breathing. This state of open communication between the conscious and unconscious obtains whenever the observing ego gets out of the way. In a fit of laughter, there is no ego -- no censorship of messages flowing back and forth in the brain. What strikes the mind funny simultaneously sets off a self-perpetuating cycle of nervous discharges in the brainstem. Tearing is one manifestation of this exercise of the autonomic system. The diaphragmatic spasms are another. Mind and body are laughing together; the channels are wide open.

Loss of upright posture is further evidence that the cerebral cortex is not maintaining its usual hold on brain function in a fit of laughter. I say this because it occurs in other conditions where it is clearly associated with suspension of cortical activity. Grand mal epilepsy -- "falling sickness" -- is one example. Another is a rare ailment called cataplexy, whose symptoms are discrete attacks of loss of upright posture. It is reasonable to conclude that when a laughing fit proceeds to the point of dropping to the floor, there is a higher-than-normal ratio of brainstem vs. cortical activity -- of unconscious vs. conscious determination of experience.

Not surprisingly, the result is a high. Exhaustion may follow, too, but it is the exhaustion of a feat accomplished, of work well done. I cannot imagine that the effect on the body is anything but that of an invigorating tonic. In fact, I am tempted to investigate the feasibility of basing an entire system of medical practice on the induction of laughing fits in patients.

Of course, painful stimuli will produce flows of tears,

too, and, no doubt, good solid crys are also cathartic and beneficial. In THE NAKED APE (McGraw Hill, New York, 1967; p. 116) Desmond Morris writes: ". . . it is important to realize how similar crying and laughing are, as response patterns. Their moods are so different that we tend to overlook this. . . . It appears that the laughing reaction evolved out of the crying one . . . ."

In certain kinds of modern psychotherapy, such as group encounter, great value is placed on breaking down the defenses of participants. If people are reduced to tears, for instance, the encounter is successful. These tears may be therapeutic. But encouraging reintegration of the personality afterward is much more difficult than breaking down defenses, and the encounter method is sometimes not successful with it.

An interesting medical application of crying is suggested by the Reverend Robert Alexander, Bishop, Founder, and Director of The Temple of Man in Venice, California. He wrote me recently:

> For many years now, perhaps thirty in all, I have been trying to convince people that the explanation of the common cold lies in understanding that the symptoms are caused by the uncried tears of man -- tears not expressed through normal grief-releasing mechanisms. Perhaps, what with the Wailing Wall of the Ancients in good wailing order, we, too, could relieve ourselves of this pesky disorder with nothing more than a good honest cry.

Perhaps so. But all other things being equal, I would rather laugh my way to health and enlightenment than weep it, and I wonder how to turn more people on to the value of outrageous laughter.

The relationship of drugs to laughter is not direct, although three drugs are commonly associated with it. Those three are alcohol, marihuana, and nitrous oxide, also known as laughing gas. Hilarity is often a symptom of the early stages of alcoholic inebriation, especially in groups. Larger doses of alcohol more commonly produce boisterousness or morose withdrawal. Nitrous oxide, which has the same pharmacological effect as alcohol but

is a much less toxic drug, also can trigger hilarious laughter at low doses, particularly in groups. Higher doses, taken in less convivial settings are more often associated with states of deep introspective reverie and philosophic or mystic insights that evaporate almost as soon as one stops breathing the gas. Marihuana -- a different sort of drug -- also facilitates laughter, again more in group settings where participants are set to laugh.

Laughing fits seem to be correlated with drug effects only to the extent that drugs allow for a moderate degree of social disinhibition. There is no laugh center in the brain that is stimulated by alcohol, marihuana, and laughing gas. Rather, the mild effects of these drugs at low dose ranges in appropriate settings provide excuses for people to lose control of themselves. My grandmother would never allow herself to have the giggles most of the time. The after-dinner Alexander became a ritual excuse that was tolerated by her relatives, all of whom, I am sure, wanted to be laughing along with her but could not let themselves go.

Any situation encouraging social disinhibition favors laughing fits. Perhaps the best trigger of all is the sight of someone else doing it, for laughing, like yawning, is highly contagious. A really good laugher in the right setting can get a lot of other people to join him. Done ritually and regularly, group laughing fits could serve as the basis for a new system of psychotherapy or even a new religion. Wouldn't that be nice?

Sincerely yours,

Andrew T. Weil

Andrew T. Weil

Received in New York on March 29, 1973